CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
http://doi.org/10.5281/zenodo.2716386

Available online at: http://www.iajps.com *Research Article*

# HOW AND WHAT TYPE OF RESEARCH CAN EFFECTIVELY ARREST ALL FORM OF TUBERCULOSIS ESPECIALLY LATENT INFECTIOUS TUBERCULOSIS

**[1]Dr. Manal Tanveer, [2]Dr. Anjum Hameed, [3]Dr. Zermina Azhar**

[1]House Officer, Jinnah Hospital Lahore, [2]MALC, Regional Coordinator- Gilgit-Baltistan, [3]House Officer Gynae Unit 2 Jinnah Hospital Lahore.

**Article Received:** March 2019 **Accepted:** April 2019 **Published:** May 2019

**Abstract:**

*The primary objective of this research was to provide advocacy and leadership to use more resources for the global TB control program along with the provision of fund receiving forums and TB research implementation. Tuberculosis (TB) causes millions of deaths every year across the globe and it is ranked among most alarming infectious diseases. This research overviews general treatment guidelines, diagnosis and pathogenesis of TB. Before commencement of this review, we explored related articles on PubMed; in addition to that, we also searched international institutes official pages on the web such as WHO for related clinical guidelines and reports. The objective of this research paper is to spread general awareness among healthcare professioanls in order to educate them along with the education of public, patients and policy makers.*

*It also aimed to ensure outcomes through identified opportunities and fill the gaps. The movement against TB is a partnership and collaborative effort to arrest TB. This movement operates under the guidelines of WHO and research related protocols. There were two major components of research-oriented movement consisting of global TB research analysis and development of research roadmap to arrest TB. Many others also became the part of this campaign including research, scientists, development, operational and applied research with agencies and stakeholders.*

**Keywords:** *All Form Of Tuberculosis, Specially, Latent Infectious Tuberculosis, Effectively, Arrest.*

**Corresponding author:**

**Dr. Manal Tanveer,**

*House Officer, Jinnah Hospital Lahore.*

QR code

*Please cite this article in press Manal Tanveer et al.,* ***How and What Type of Research Can Effectively Arrest All Form of Tuberculosis Especially Latent Infectious Tuberculosis.,*** *Indo Am. J. P. Sci, 2019; 06(05).*

## INTRODUCTION:

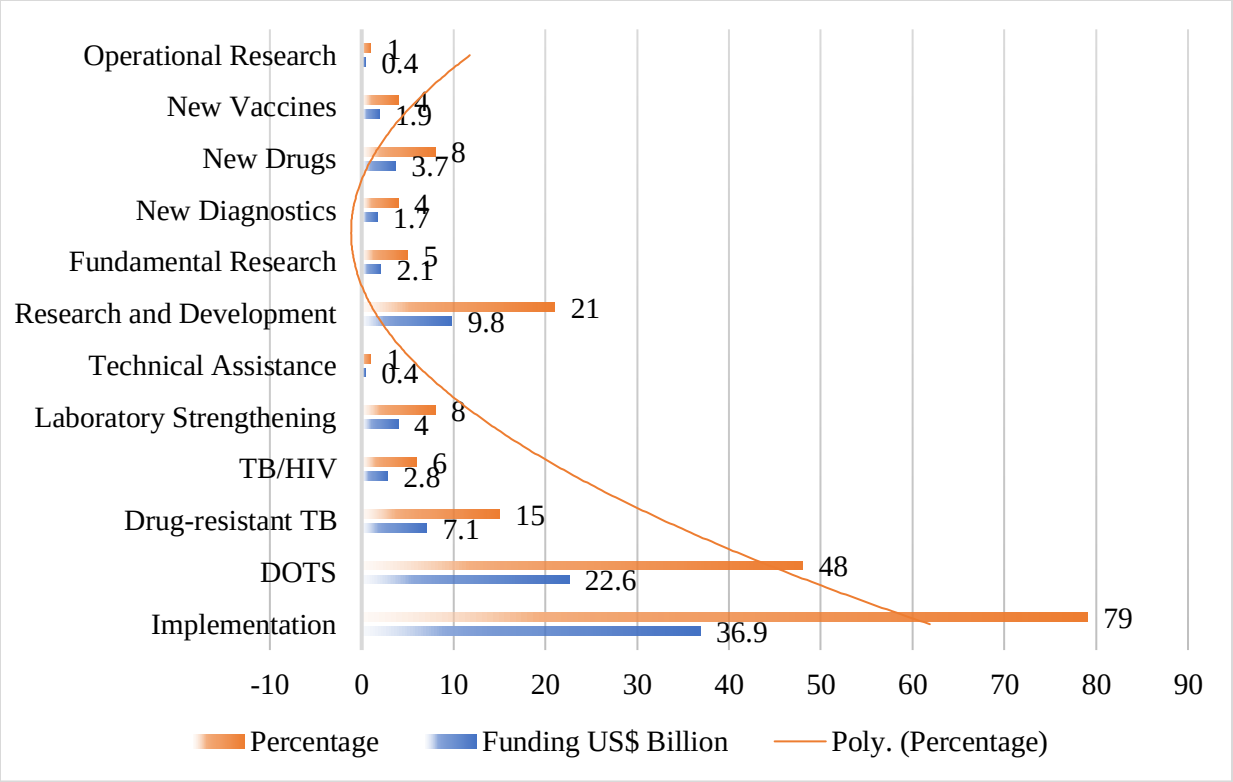
Tuberculosis is an unacceptable burden with its increased disease burden and mortality rate [1]. Its diagnostic tools are not that much effective which tend to use older technology for the measurement of disease burden. Sputum microscopy is an older type of Tuberculosis diagnostic tools which required proper supervision, adherence and treatment such as Tuberculosis vaccines and drugs. Better Tuberculosis controls required new diagnostic and treatment options [2]. Research work performs a key role in the achievement of health goals. The research aims to decrease the levels of deaths due to TB than previous levels of 1990 [3]. Since 2004, the rate of TB is falling at a rate of one percent annually [1]. Realistic goal achievement depends on TB control technological revolution. Basic implementation and accelerated goals achievement are possible through increased research work [4]. To recognize this need, accelerated research work is required to arrest TB in order to achieve international goals [5, 6].

## RESULT:

It includes various questions such as "Who is funding? How much is funding? and What is being funded?''. Various elements and questions were brought together for research and development [7]. The estimate of the revised Global TB stop plan was US$ 9.8 Billion back in 2011 – 2015 which required fifty percent in the prevalence of TB which was least required [8]. This plan included target investments for operational and fundamental research for new vaccines, diagnostics and drugs.

**Table – I:** Funding Details

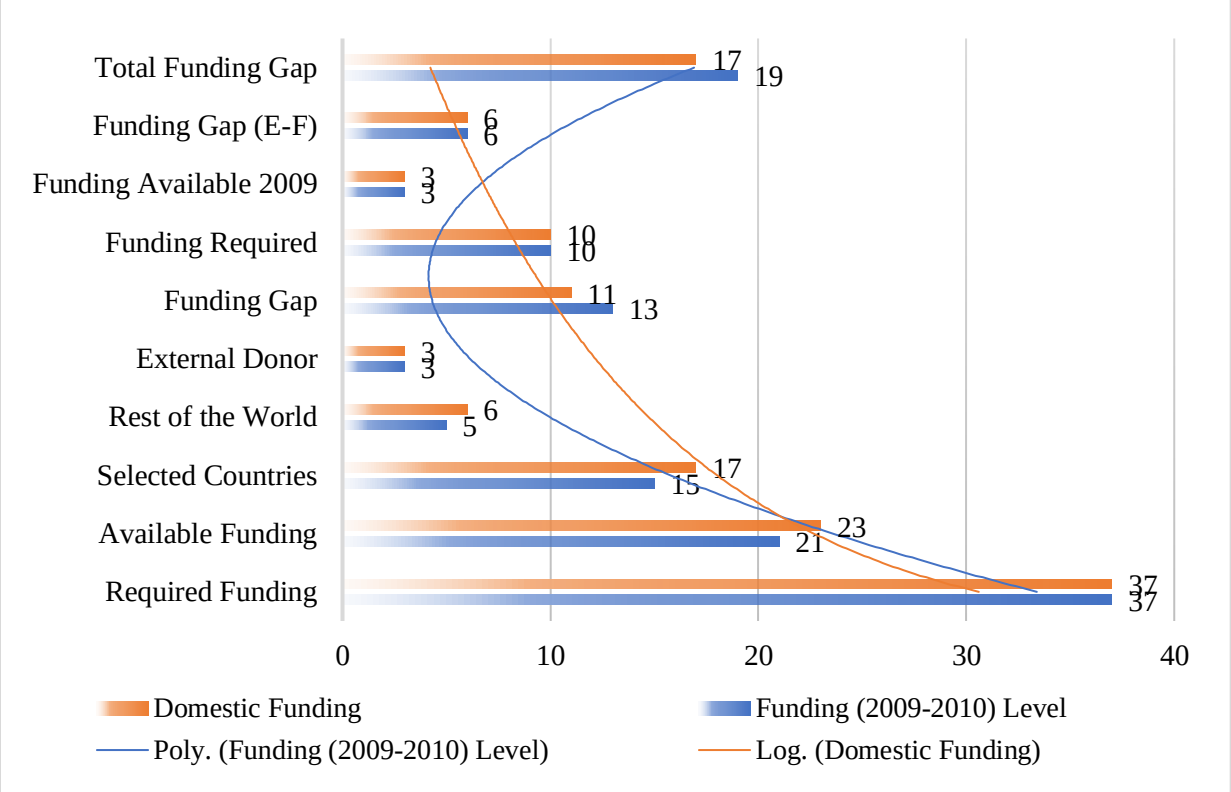
| Component | Funding US$ Billion | Percentage |
|---|---|---|
| Implementation | 36.9 | 79 |
| DOTS | 22.6 | 48 |
| Drug-resistant TB | 7.1 | 15 |
| TB/HIV | 2.8 | 6 |
| Laboratory Strengthening | 4 | 8 |
| Technical Assistance | 0.4 | 1 |
| Research and Development | 9.8 | 21 |
| Fundamental Research | 2.1 | 5 |
| New Diagnostics | 1.7 | 4 |
| New Drugs | 3.7 | 8 |
| New Vaccines | 1.9 | 4 |
| Operational Research | 0.4 | 1 |
| All Components | 46.7 | 100 |




Research and development funding details are as under with respect to the funding level of 2009 – 2010 and domestic funding.

**Table – II:** Research and Development

| Research and Development | Funding (2009-2010) Level | Domestic Funding |
|---|---|---|
| Required Funding | 37 | 37 |
| Available Funding | 21 | 23 |
| Selected Countries | 15 | 17 |
| Rest of the World | 5 | 6 |
| External Donor | 3 | 3 |
| Funding Gap | 13 | 11 |
| Funding Required | 10 | 10 |
| Funding Available 2009 | 3 | 3 |
| Funding Gap (E-F) | 6 | 6 |
| Total Funding Gap | 19 | 17 |

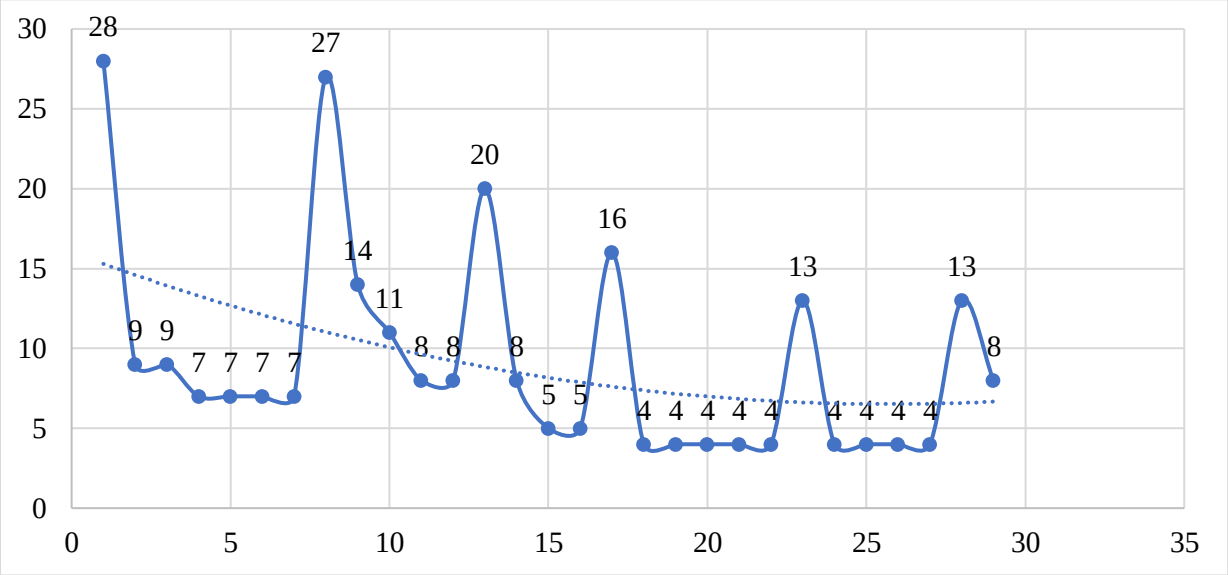



Global TB research and development plan span over a variety of topic, which is as under:

**Table – III:** Topic Details

| Topic | Number |
|---|---|
| Drug Use and Development | 28 |
| Chemoprophylaxis Effectiveness | 9 |
| Optimal Drug Treatment Duration | 9 |
| New Anti-TB Drug Development | 7 |
| Standard Pharmacokinetics Drugs | 7 |
| Drug Interaction | 7 |
| Second Line Drugs Pharmacokinetics | 7 |
| Diagnostic and Diagnosis Test | 27 |
| Active TB Novel Diagnostic | 14 |
| Methods for Drug Sensitivity Test | 11 |
| Active TB Diagnostic Evaluation | 8 |
| Successful Treatment Biomarkers | 8 |
| Public Health and Epidemiology | 20 |
| Global TB Burden Measurement | 8 |
| Community Role in TB Determination | 5 |
| Literacy Programs Effect | 5 |
| Health Services Research | 16 |

| | |
|---|---|
| Diagnostic Delay Causes | 4 |
| TB Related Costs | 4 |
| Case Finding Role | 4 |
| Integration of HIV and TB Services | 4 |
| Staff Training | 4 |
| Basic Scientific Research | 13 |
| TB Protection Identification | 4 |
| Latency Understanding | 4 |
| Understanding Phenotypic and Genetic Markers | 4 |
| Animal Model Development | 4 |
| Vaccine Development | 13 |
| New TB Vaccine Trials | 8 |




**TB research Agendas:**

In the past ten years, various groups have posed different research agendas. We also carried out a systematic review for TB research agendas for the evaluation of main research themes and questions. We need to assess priorities and methods to identify emerging messages [9]. Various articles and papers were shortlisted for review which was on different topics with a broader perspective. Questions mainly focused on prevention, treatment of MDR-TB and TB/HIV co-infection. These questions also reflected the inefficiencies of short-course chemotherapy limitations and sputum smear microscopy. There is a vibrant need for health system and epidemiology research for effective TB control. Most of the investigations are affected by less priority given to basic research. Great variations are found in the identification priorities and methods. Counselling and expert opinion also provide objective measurable criteria and priorities of the research. Importance of research questions is greatly helpful for the systemic review of the reproducible criteria.

**Key Research Questions:**

There were four workshops conducted in 2009 – 10 which laid the roadmap in order to identify priorities and gaps for the continuous research process. Workshops included different discussions on various topics such as vaccines, drugs and diagnostics. A number of scientists, civil society, program managers, members and donors attended the workshop. The objectives of this workshop were a review of research activities, new diagnostics, vaccines and drug development. Science primarily intervened the improvement of TB control innovative programs [10].

The workshop conducted in 2010 was to fight against Tuberculosis, AIDS and Malaria through pragmatic and operational research to control and care TB. These workshops identified five major areas of screening & diagnosis access, sustainable collaborative development to arrest TB, treatment & prevention of TB among HIV patients, optimal delivery and access to delivery and capacity building. Various questions were developed by the participants with different suggestions and comments to arrest TB [11, 12].

**Prioritization of research questions:**

About 250 research-based questions were raised in the workshops in different areas which include basic science, research and development of vaccines, drugs and diagnostics, public health and operational research. These questions were classified through objectivity and measurable indicators such as child health and nutritional state [13]. Prioritization was also dependent on the ultimate utilization of tools to counter mortality and morbidity due to TB. Priority ranking process included wide research areas, clinical care, public health and managerial aspects.

**International TB elimination research roadmap:**

Better TB control is possible through addressing key questions about TB research program in a specified timeline as prescribed by the experts to handle feasibility and knowledge gaps. A common framework is possible through the collaborative effort for TB control along with the promotion of TB research especially in the countries with higher burdens of TB. Various international forums have also discussed key scientific ideas among NGOs and stakeholders with the support of World TB investors. The objective of this meeting was to discuss the roadmap of global, synergetic and harmonized TB research with coordinated funding. It was conclusively agreed to speed up the research and coordination process of TB research.

## DISCUSSION:

TB research response is pressing issue all over the world for human and health development with accelerated TB control progress. TB control affects the direct impact on the reduction of TB burden and also saves lives; moreover, it also helps to control poverty and promotes economic and social progression. New tools have been introduced in the last decade after years of neglect. At present TB control is better than ever as breakthroughs have been achieved and much more is in pipeline. Latest breakthroughs include MTB/RIF which is capable to diagnose TB and rifampicin in a time of one hundred minutes [14]. More trials on Phase I & II are also in the pipeline of pre-clinical and clinical research [15].

Ten vaccines are in the clinical evaluation process among which four are in Phase-II [16]. Most of the funds are raised through a public-private partnership which is very much helpful for the ongoing research and development process. The combined effort is mandatory to arrest TB in an effective way by 2050 along with the implementation of new diagnostic and treatment strategies including drug-resistant TB, drug suspectable TB, overt TB short treatment and massive vaccination campaigns [17]. More work is required to develop diagnostic and treatment approaches for all types of TB which also includes latent Tuberculosis infection [18].

Potential risk groups need special focus as until the development of phase the combinational treatment may be optimal for such cases [19]. There is a higher attrition rate of development pathway with success chances of the emerging products especially for new products [20]. Research also requires reinforced health control to counter endemic countries through innovative processes [21]. WHO endorses newly introduced tools through recommended technical support and policies in vogue especially for the molecular diagnostics and also strives for the availability of the latest developed tools [20]. Rapid transfer of newly emerged products is only possible through global coordination especially in the endemic countries. Still primary and major challenges need attention. Intake of donors and rationalized used of funds for research and development purposes is also necessary. Highly affected regions can also play their role in this process through health seminars and workshops with shared objectives and roadmaps [22, 23].

## CONCLUSION:

More discussion forums will build even stronger consensus and harmonized global TB control research programs in the coming years through practice and policy. It is a cross-disciplinary coordinated effort which addresses and identified strategic concrete public health results. International TB research and development program to arrest TB will act as a concrete framework to synergize all the efforts made for TB control through research efforts all over the world. Research movement can crucially handle the existing resources and it can also accelerate much required TB research programs in order to achieve internationally set targets.

## REFERENCES:

1. Lienhardt C, Vernon A, Raviglione MC (2010) New drugs and new regimens for the treatment of tuberculosis: a review of the drug development pipeline and implications for national programmes. Curr Opin Pulm Med 16(3): 186–193.
2. Pai M, Minion J, Steingart K, Ramsay A (2010) New and improved tuberculosis diagnostics: evidence, policy, practice, and impact. Curr Opin Pulm Med 16(3): 271–284.
3. Lienhardt C, Cobelens F (2011) Operational research for improved TB control: the scope, the needs and the way forward. Int J Tuberc Lung Dis 15(1): 6–13.
4. BRICS Health Ministers (11 July 2011) BRICS Health Ministers' Meeting–Beijing Declaration. Available: http://keionline.org/node/1183. Accessed20 October 2011.
5. UNAIDS (11 July 2011) First meeting of BRICS health ministers bring new leadership to global health [press release]. Available: http://www.unaids.org/en/resources/presscentre/featurestories/ 2011/july/20110711bchinabrics/. Accessed 20 October 2011.
6. Raviglione MC, Uplekar M (2006) WHO's new Stop TB Strategy. Lancet 367: 952–955.
7. Treatment Action Group (2010) 2010 report on tuberculosis research funding trends, 2005–2009.New York: Treatment Action Group, Available: http://www.treatmentactiongroup.org/tbrd 2010. Accessed 3 November 2011.
8. Stop TB Part and WHO (2006) The global plan to stop TB, 2006–2015. WHO/HTM/STB/2006.35. Geneva: WHO.
9. Rylance J, Pai M, Lienhardt C, Garner P (2010) Priorities for tuberculosis research: a systematic review. Lancet Inf Dis 10: 886–892.
10. Stop TB Partnership (2010) Workshop on fundamental research for tuberculosis. Draft workshop report; 18–19 March 2010; Bethesda, Maryland, United States. Geneva: World Health Organization, Available: http://www.stoptb.org/assets/documents/research/report%20fundamental %20research%20workshop.pdf. Accessed 20 October 2011.
11. Stop TB Partnership (2010) Promotion and rationalization of operational research activities in TB control. Draft workshop report; 11–12 May 2010; Geneva, Switzerland. Geneva: World Health Organization, Available: http://www.stoptb.org/assets/documents/research/Draft%20Report%20 OR%20Workshop%20v4.pdf. Accessed 20 October 2011.
12. Stop TB Partnership, Global Fund Against AIDS, Tuberculosis and Malaria, World Health Organization (2011) Priorities in operational research to improve tuberculosis care and control. Geneva: WHO.
13. Rudan I, El Arifeen S, Black RE, Campbell H (2007) Childhood pneumonia and diarrhoea: setting our priorities right. Lancet Infect Dis 7:56–61.
14. Boehme CC, Nabeta P, Hillemann D, Nicol MP, Shenai S, et al. (2010) Rapid molecular detection of tuberculosis and rifampicin resistance. N Engl J Med 363(11): 1005–1015.
15. Ma Z, Lienhardt C, McIlleron H, Nunn AJ, Wang X (2010) Global tuberculosis drug development pipeline: the need and the reality. Lancet375(9731): 2100–2109.
16. Kaufmann SHE, Hussey G, Lambert P-H (2010) New vaccines for tuberculosis. Lancet 375(9731):2110–2119.
17. Abu-Raddad LJ, Sabatelli L, Achterberg JT, Sugimoto JD, Longini IM, Jr., et al. (2009) Epidemiological benefits of more effective tuberculosis vaccines, drugs and diagnostics. Proc Natl Acad Sci U S A 106(33): 13980–13985.
18. Wallis RS, Pai M, Menzies D, Doherty TM, Walzl G, et al. (2010) Biomarkers and diagnostics for tuberculosis: progress, needs, and translation into practice. Lancet 375(9729): 1920–1937.
19. WHO (2009) Global tuberculosis control. WHO report 2009 (WHO/HTM/TB/2009). Geneva: WHO.
20. Marais BJ, Raviglione MC, Donald PR, Harries AD, Kritski AL, et al. (2010) Scale-up of services and research priorities for diagnosis, management and control of tuberculosis: a call to action. Lancet 375(9732): 2179–2191.
21. Stop TB Part and WHO (2010) Global plan to stop TB, 2011–2015: transforming the fight towards elimination of tuberculosis. Geneva: WHO.
22. Chaisson RE, Harrington M (2009) How research can help control tuberculosis? Int J Tuberc Lung Dis 13(5): 558–568.
23. World Health Organization (2006) Engaging for health. 11th General Programme of Work 2006–2015. A global health agenda. Geneva: WHO.